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ABSTRACT

Although the effects of occupational or work stress have received considerable attention in recent years, few studies have attempted to systematically measure the construct. Prior to this study, Scale 1 of the Work Stress Inventory was developed to measure three indices: (1) appraised stress; (2) frequency of stressful situations; and (3) composite overall stress, as they relate to organizational stress and communication. Scale 1 was found to reflect organizational exclusion or alienation. To investigate job task situations associated with stress, 227 working adults (84 males, 143 females), from 34 occupations, completed Scale 2 of the Work Stress Inventory. The 58-item Scale 2 was designed to measure individual stress perceptions in relation to threats to safety and job security, and adverse environmental and mental working conditions. Based on item-total correlations the Scale was reduced to 20 items. The reduced Scale 2 and Scale 1 were then administered to 385 working adults (150 males, 235 females). Scores for the three indices (stress appraisal, frequency, and composite stress) were calculated. An analysis of the results supported the validity of the inventory as an overall measure of work stress and of the Scales as different facets of the construct. Two facets to the construct of work stress were identified: organizational alienation and job risk. These findings suggest that the Work Stress Inventory may be a useful instrument in assessing occupational stress. (BL)

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# WORK STRESS INVENTORY, SCALE 2: JOB RISK

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Work Stress Inventory, Scale 2: Job Risk

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Presented at the Meeting of the Southeastern Psychological Association,

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Occupational or work stress has been receiving considerable attention in recent years (Beehr & Newman, 1978; Newman & Beehr, 1979; Schuler, 1980). Claims have been made that occupational stress has deleterious effects on physical health (e.g., cardiovascular and gastrointestinal disorders), psychological well-being (e.g., depression, apathy, and job dissatisfaction), and organizational productivity (e.g., absenteeism, job turnover). (For reviews see Beehr & Newman, 1978; Cooper & Marshall, 1976; Ferguson, 1973.) Further, psychologists, management consultants, and a host of would-be experts provide training in stress reduction, typically purporting that their program "has been proved successful," (Burke & Weir, 1980; Field & Olson, 1980; Weinrach, 1980).

Surely one would expect sophisticated assessment of work stress. Surely there must be well-researched measures being related to indicators of its purported effects and being shown to change with its successful treatment. The literature does not bear out these expectations. This is a topic puffed full with claims but short on measurement. With few exceptions (e.g., Rizzo, House, & Lirtzman, 1970), research relies on answers to one or a few questions about experienced stress. Alternatively, stress may be inferred rather than measured from the presence of indicators assumed to be its effects. Thus, what research there is in this area has a foundation of unknown or low reliability and validity. The program of research being reported here seeks to provide a psychometrically sound instrument to measure work stress.

Since stress is a term so used and abused, a clear conceptualization is necessary to guide the development of a measurement strategy. Stress is viewed here as a transactional construct (cf. Lazarus, 1966; McGrath, 1976; Beehr & Newman, 1978), as involving a misfit between environmental demands and individual capabilities. The construct centers on the appraisal of this misfit by the individual and on associated psychological conditions (emotional, motivational, etc.) and physiological changes which themselves form one basis for appraisal. Such a conception suggests a measure of work stress in which individuals appraise or rate the intensity of stress they experience or would experience in specific work situations. An inventory of such ratings yields an index of individual differences in stress appraisal. This is not an adequate index of job stress; without information on frequency of these situations, what is being measured is stress vulnerability, not stress experienced. The inventory, then, also needs to ask respondents to report the frequency of occurrence of the same set of potentially stressful work situations. Summing these frequencies yields an index of individual differences in exposure to potential job stressors. Finally, weighting appraised threat in each situation by its reported frequency and summing across situations provides an overall composite index of individual differences in experienced job stress. Such a strategy, then, provides a convenient means of measuring simultaneously a person variable (work stress appraisal) a situation variable (work stressor frequency), and an interactional variable (composite work stress experienced). These will be referred to as the appraisal, frequency, and composite indices. Appraisal should be affected by stress reduction training but not (as a person variable) by job restructuring or reassignment. Frequency should discriminate between jobs with different exposure to potential stressors

and should (as a situation variable) be affected by job restructuring or job reassignment. The composite index should pick up all these differences.

Scale 1 of the Work Stress Inventory (Hamilton, Barone, Katell, & Caddy, 1981; Hamilton, Barone, Katell, & Caddy, 1982) was constructed to measure appraisal, frequency, and composite stress related to organizational structure and communication, the focus of most recent research on occupational stress. Work situations covered involve role conflict and ambiguity, interpersonal relationships on the job, and job overload and underload. Based on the responses of a heterogeneous sample of 300 males and females across the three indices, the original 99 items were reduced to 25. The results of this sample and a cross-validation sample of 150 found these items to have symmetrical distributions, high intercorrelations, (coefficient alphas > .91) and high loadings (>.37) on a large first factor (variance accounted for > 34%). The retained items deal with employees' perceived lack of information, input into decisions, and autonomy; lack of clear communication, recognition and support from superiors; and conflicting job demands. Thus, this scale may be viewed as reflecting organizational exclusion or alienation.

A validation study of this scale was carried out with another sample of 200 subjects, who completed this work stress questionnaire and ones on job satisfaction (JDI), daily stresses (Hassles Scale), and anxiety (STAT). The results showed no uniform level of relationship and therefore fail to support a hypothesis of shared method variance due to the common questionnaire format. The results do support construct validity of the frequency and composite indices in that they were significantly related ($r$ = .20 to .37) in the expected directions to measures of the related constructs of job satisfaction, daily stresses and anxiety, but the relationships were low enough

(10% of the variance) to support the divergence of constructs. These findings suggest that individual differences in frequency of job stressors are more relevant than IDs in stress appraisal to the assessment of occupational stress.

The present research sought to investigate other work situations commonly associated with stress. Instead of relating to the organization, these situations relate to the job task itself. They include threats to one's own and other's safety, emergency responding, threats to one's job security, aversive environmental conditions (e.g., heat, noise, dangerous chemicals), and aversiveness related to one's job being physically tiring, monotonous, or requiring attention to detail. These job characteristics predate the present concern with organizational stress and were typically investigated in specific occupations such as air traffic control, law enforcement, hospital emergency and surgery, and dangerous labor such as mining and machine operation. The first study being reported here involved development of a scale of task stress to use across occupations and in conjunction with the organizational stress scale on the Work Stress Inventory.

There were 227 subjects in the first study, 84 males and 143 females. They were recruited from a variety of occupations including ones claimed to have high task stress: medicine, nursing, police and probation, human services, and education. In all, there were 34 occupational titles. The questionnaire they completed had 58 items related to task stress and had the same response format as used for organizational stress. For example, one item is: "Working for long periods of time without rest." A respondent gives one of five ratings for the amount of stress experienced for this item: none, little, a moderate amount, much, or very much. Then he or she indicates one of five

frequencies of occurrence: never, rarely (described as 1 to 4 times per year), sometimes (1 to 4 times per month), often (3 to 5 times per week), or daily (more than 1 time per day). The sum of these responses on 58 items yielded scores on the appraisal and frequency indices and the sum of their products yielded scores on the composite stress index. Although the utility of the appraisal index was not supported for Scale 1, it was included in this scale to collect additional data on it and to be able to derive the composite stress index.

The results for the three indices on the initial item pool found coefficients alphas of .93 to .96 and intercorrelation matrices 95 to 100% positive. Items were selected for the final scale of 20 items which scored best for all three indices on the following criteria: item-total correlation, interitem correlation, and distribution symmetry. For the three indices, the 20 items had individual item-total correlations $\geq .36$, mean item total correlations $\geq .56$, and mean interitem correlations $\geq .35$. Coefficient alpha for the reduced indices were $> .91$. As expected, because the scale was reduced on the basis of internal consistency on all three indices, factor analyses revealed large first factors accounting for > 40% of the variance. The final findings were correlations between appraisal and frequency indices of .23, frequency and composite stress of .87, and appraisal and composite stress of .49.

The items not retained on the reduced scale involved threats to job security, prolonged attention to detail, and excessive heat or noise on the job. Items retained involved threats of harm to one's self and others, emergency responding, and working excessively or while fatigued. These latter categories also involve threat of harm, especially when occurring for nurses,

paramedics, or firefighters. Thus, this second scale taps job risk.

The second study of Scale 2 involved administering it and Scale 1 together. This study sought to cross-validate the reduced Scale 2, investigate the factor structure of the overall inventory, provide work stress scores across occupations, and offer further construct validity for the inventory. The 385 subjects recruited were 150 males and 235 females employed in a wide variety of occupations, including ones usually associated with high stress. Cross-validation results on the three indices were almost identical to the first sample: coefficient alphas $\geq .91$, individual item-total correlation $\geq .35$, mean item-total correlations $\geq .55$, and a large first factor accounting for $\geq 37\%$ of the variance. The factor structure found for Scale 1 replicated previous studies: a large first factor on each index accounting for $\geq 41\%$ of the variance. Also, as found previously, frequency and composite stress were highly correlated on both scales ($\underline{r} \geq .90$), whereas appraisal correlated much less ($.26 \leq \underline{r} \leq .59$) with these two indices.

Results on the factor structure of the entire inventory are of special interest to the validation of the inventory as an overall measure of a single construct and of the scales as different facets of the construct. A major factor on each of the indices emerged from a principal components factor analysis; it accounted for 29 to 41% of the variance. This finding supports the validity of the inventory's measurement of work stress as a unitary construct. Varimax rotation of all extracted factors with eigenvalues $> 1.0$ revealed two factors corresponding to the two scales. For the highly correlated frequency and composite stress indices, items on Scale 1 loaded on the primary factor (70% and 58% of the variance) and items on Scale 2 loaded on the secondary factor (14% and 17% of the variance). On the appraisal index, the

relationship was reversed: Scale 2 loaded on factor 1 (54% of variance) and Scale 1 loaded on factor 2 (19% of the variance). These results support the presence of two empirically identifiable facets to the construct of work stress, Organizational Alienation and Job Risk, tapped by the two scales on the Work Stress Inventory.

An initial analysis of differences across scales and occupations provides further validation of the inventory. On average item scores ranging from 0 to 4, appraisal was identical (2.07 and 2.01) on Scales 1 and 2; however, frequency was much higher for Organizational Stress than for Job Risk (3.14 vs. 1.39), as was expected. Scores across occupations also were as expected. On Risk frequency, paramedics scored highest (2.17) and telephone operators lowest (.88); however, their other three scores were about the same. Another interesting comparison is between hospital and home-visiting nurses. On frequency of both Organizational Stress and Job Risk, the former scored much higher (1.58 and 1.87) than the latter (.86 and .91). However, on appraisal of these two kinds of stress, the two groups of nurses scored about the same. Other results by sex, age, job level, and occupation are being analyzed with the expectation that they will demonstrate further the validity of the inventory.

In summary, five studies have been conducted with over 1,200 subjects from a wide variety of occupations. The Work Stress Inventory was found to be a reliable and valid measure of occupational stress. Its two scales tap different facets of this construct, one relating to Organizational Alienation and one to Job Risk. For each scale, it yields scores on three indices: appraised stress, frequency of stressful situations, and composite overall

stress. It is expected that the Work Stress Inventory will prove to be a useful instrument for research and application involving occupational stress.

## Author Notes

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